

(No Model.)

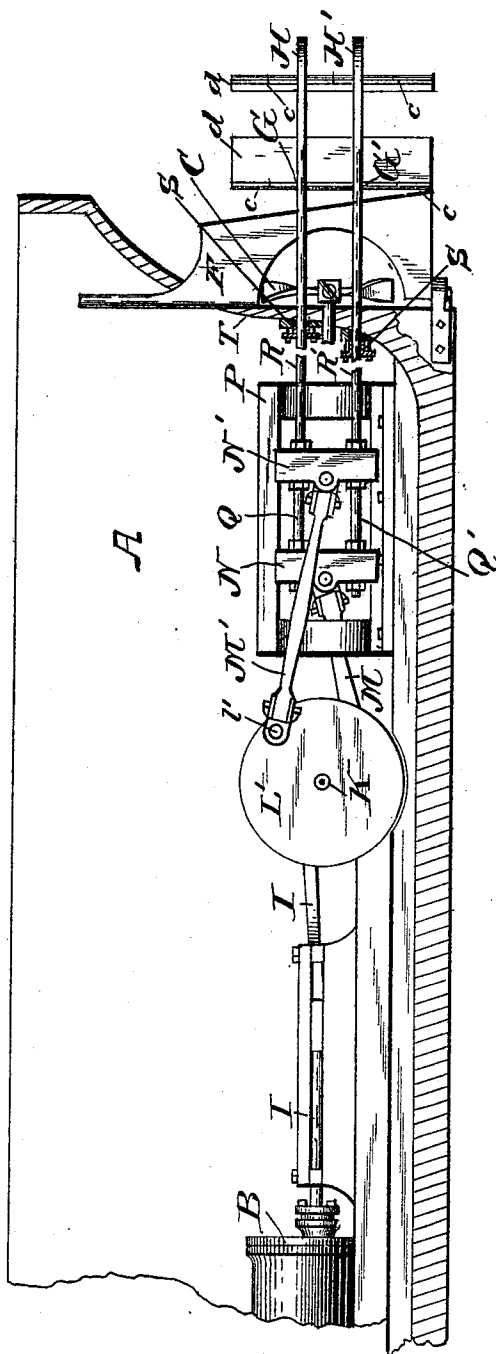
3 Sheets—Sheet 1.

W. K. HOGAN.

RECIPROCATING PROPELLER FOR VESSELS.

No. 516,535.

Patented Mar. 13, 1894.



WITNESSES:
J. L. Curand
Amos Jones

INVENTOR:
William K. Hogan.
by Louis Bagger Co.
Attorneys.

(No Model.)

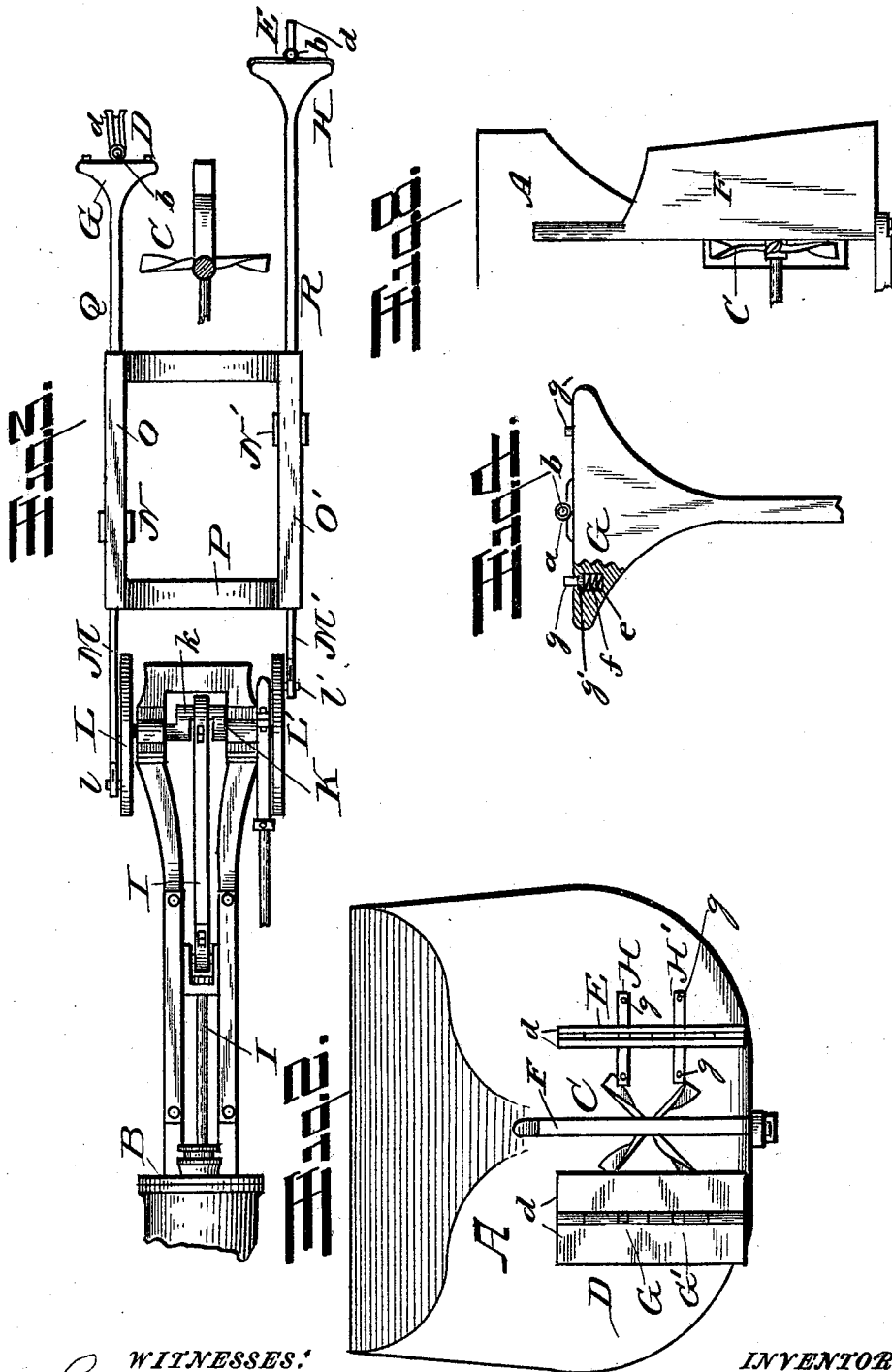
3 Sheets—Sheet 2.

W. K. HOGAN.

RECIPROCATING PROPELLER FOR VESSELS.

No. 516,535.

Patented Mar. 13, 1894.



WITNESSES:
F. L. Curran
Amos J. Jones

INVENTOR:
William K. Hogan
by Louis Baggen Co.
his Attorneys

(No Model.)

3 Sheets—Sheet 3.

W. K. HOGAN.

RECIPROCATING PROPELLER FOR VESSELS.

No. 516,535.

Patented Mar. 13, 1894.

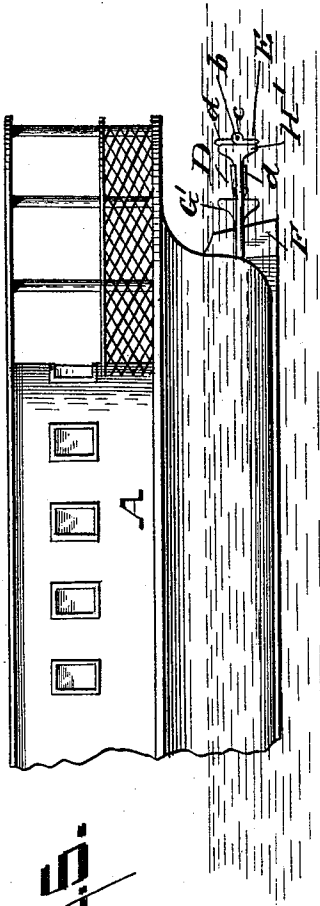


Fig. 5.

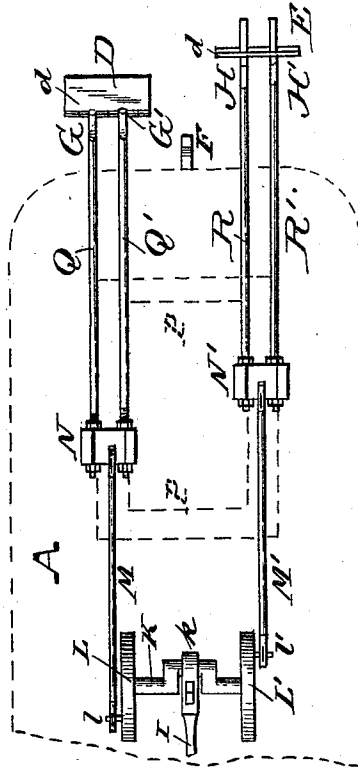
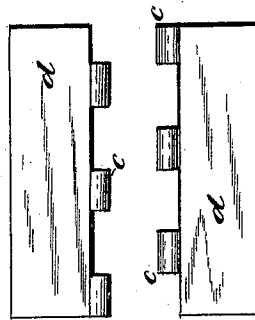


Fig. 6.



Witnesses:
H. L. Durand
James H. Gandy

Inventor:
William K. Hogan.
by *Louis Baggett & Co.*
his Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM K. HOGAN, OF BRADFORD, PENNSYLVANIA.

RECIPROCATING PROPELLER FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 516,535, dated March 13, 1894.

Application filed April 24, 1893. Serial No. 471,688. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM K. HOGAN, a citizen of the United States, and a resident of Bradford, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Steamboat-Propellers; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a longitudinal sectional view of the aft part of a canal boat equipped with my improved propeller. Fig. 2 is an elevation of the stern of the boat with its propellers. Fig. 3 is a plan of the engine and propellers. Fig. 4 is a detail view of one of the propeller-bearings. Fig. 5 is an elevation of the aft part of a boat, showing a modified construction of the propeller. Fig. 6 is a plan of the modified form of propeller shown in elevation in Fig. 5. Fig. 7 is a detail view of a pair of the hinged propeller-blades, separated from each other, and Fig. 8 is a detail view of the rudder and steering-propeller.

Like letters of reference denote corresponding parts in all the figures.

This invention relates to improvements in propellers for steam boats, of that class or character in which horizontally reciprocating propeller shafts are employed, having hinged propeller blades at their outer ends, which blades are opened when the said shafts are forced outwardly, so as to push against the water, and which are closed or folded on the return stroke of the shafts so as to afford but little obstruction to such movement.

The invention consists in the novel construction and combination of parts hereinafter fully described and claimed.

Referring to the accompanying drawings, the reference letter A denotes the aft part of a boat or vessel, and B the engine, which may be of any approved type. In this case, I have shown both propellers as operated by a single engine; but, if desired, there may be two engines, one for each propeller; and, in addition, there may be a third auxiliary engine for working the steering and backing screw-propeller, shown at C. This propeller

is located at the stern, in the longitudinal axis of the vessel, and requires a separate engine to operate it.

The main propellers, the construction and arrangement of which constitute my invention, are shown at D and E, there being one on each side of the central screw-propeller, C, and rudder, F. These two main propellers are constructed exactly alike, each consisting of a pair of blades or wings, *d*, having hinges, *c*, by which they are hinged upon a pintle, *b*, at the outer end of the propeller heads or bearings, G G' and H H'. That is to say, each of the propellers, D and E, is hinged upon two heads or bearings of the same size and shape and placed in alignment with each other, either vertically or horizontally, as will be hereinafter more fully explained.

Referring to the construction and arrangement illustrated in Figs. 1, 2 and 3, it will be seen that the jointed piston-rod, I, of the engine B works, by the crank *k*, a shaft K, having a circular disk or drive-wheel, L L', at each end. These disks have wrist pins, *l* and *l'*, connecting them to pitmen, M M', which are, in turn, articulated at their outer ends to cross-heads, N and N', which slide between the parallel ways, O and O', of a guide-frame, P, firmly bolted to the inside frame of the vessel. The wrist pins *l* and *l'*, upon their respective disks or drive-wheels, L and L', are located diametrically opposite to each other, so that the connecting-rods or pitmen, M and M', with their appropriate crossheads, N and N', will reciprocate in alternately opposite directions. Each crosshead has fastened to its outer end two shafts, viz: the crosshead N having attached to it the parallel shafts, Q and Q', while the other crosshead, N', has similarly fastened to it the parallel shafts R and R'. The two shafts of each pair (Q Q' and R R') are in vertical alignment with each other, and the two pairs of shafts are parallel to each other and reciprocate (*i. e.*, move forward and back) in parallel vertical planes in alternately opposite directions through water-tight stuffing-boxes, S, in the stern of the vessel, on opposite sides of the stern post. To the projecting outer end of each of the four shafts, Q Q' and R R', is rigidly fastened a propeller head or bearing, denoted, respectively, by the refer-

ence letters G G' and H H', of the construction illustrated more clearly in Fig. 4, from which it will be seen that this head or bearing is in the nature of a flat triangular plate, having eyes, *a*, projecting from the middle of its flat rear side for the insertion of the hinge-pin or pintle, *b*, by which the propeller leaves or blades are hinged upon the head. On each side of this central hinge is a recess, *e*, within which is placed a buffer spring, *f*, against which the inner end of the buffer, *g*, bears, said buffer, *g*, having an enlarged head, *g'*, within the recess, and projecting with its reduced end out through the reduced aperture leading into the recess, so that the buffer cannot fall out of its recess. The four propeller heads or bearings are all constructed precisely alike, and are, as we have seen, arranged in pairs, there being a pair for each set of propeller-blades, D and E. The object of the buffers, *g*, is to cushion the blow of the hinged propeller-blades when these are spread apart on the forward stroke of the reciprocating propeller shafts, assuming the position shown on the left side in Fig. 2. In the absence of these buffers, the suddenness of the blow, as the propeller-blades are thrown back against the head on opposite sides of the hinge, might cause the thin blades to become bent, indented, or otherwise injured, or the hinge might break; but any such danger is entirely obviated by the use of the buffers, *g*, arranged as described, viz: one on each side of the central hinge (on each propeller head), so that each propeller-blade or wing will, when opened out flat, bear against two buffers behind it.

When the propeller is to be used on canal-boats or other vessels of shallow draft, I prefer to change the position of the propeller-blades and their heads or bearings from the vertical position shown in Figs. 1, 2 and 3 to the horizontal position shown in Figs. 5 and 6. By reference to these figures it will be seen that, instead of placing the two propeller shafts appertaining to each propeller in vertical alignment with each other, they are placed side by side, or in horizontal alignment; their appropriate propeller-heads, G G' and H H', being also set on end, or in a vertical position, instead of horizontally. This is accomplished by turning the crossheads, N and N', at right angles to the position in which they are shown in Figs. 1 and 3, so that the four propeller shafts, Q Q', R and R', will all lie and work in the same horizontal plane, as shown clearly in Fig. 6. By that arrangement, the propeller may be used on vessels of very shallow draft, corresponding in depth only to the width of the propeller.

The construction of the propeller and propeller heads and bearings is not changed.

From the foregoing description, taken in connection with the drawings, the operation of my improved propeller will readily be understood. On the forward stroke of the pair of shafts appertaining to one of the propellers, the blades, *d d*, will be opened out so as to present a flat surface to the water, as shown on the left side in Fig. 2, and at H H' in Fig. 6, which, being pushed forcibly against the water, will impel the vessel. On the return-stroke of the shaft, the other shaft with its propeller will be pushed forward, spreading out its propeller-blades, while the other propeller is folded up so as to present very little resistance to the water on the back-stroke. By thus alternating the motions of the propellers, the boat will be impelled or moved in a forward direction smoothly and evenly, without sudden jars or starts, and there will be no violent agitation of the water around the propellers. If preferred, both propellers may be made to move simultaneously forward and back, instead of alternately, by simply changing the position of the wrist-pins, *l* and *l'*, upon the driving-disks, L and L'; the construction and arrangement of the propellers and their heads or bearings being the same in both cases.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination with the reciprocating propeller shafts, the propeller heads, having recesses in their outer faces, and the hinged propeller blades, of the buffers having enlarged heads working in said recesses and the coiled springs seated in said recesses and bearing against the enlarged heads of the buffers, substantially as and for the purpose specified.

2. The combination with the cranked drive shaft, the drive disks or wheels, the pitmen, the reciprocating cross heads, the sliding propeller shafts having the heads or bearings at their projecting outer ends, the buffers, having enlarged heads, seated in recesses in said heads or bearings, the coiled springs located in said recesses and the hinged propeller blades, all constructed and combined to operate, substantially as described.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

WILLIAM K. HOGAN.

Witnesses:

JNO. K. WILSON,
CHARLES F. BISETT.